

**SEVENTH APPROXIMATION**  
**DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS (Version 6, 9 April 2003)**

**IDENTIFICATION INFORMATION**

Assessment Geologist:	M.E. Brownfield	Date:	24-Feb-09
Region:	North America	Number:	5
Province:	Western Oregon-Washington	Number:	5004
Total Petroleum System:	Tertiary Marine	Number:	500402
Assessment Unit:	Tertiary Marine Gas	Number:	50040201
Based on Data as of:	IHS Energy well data (2008)		
Notes from Assessor:			

**CHARACTERISTICS OF ASSESSMENT UNIT**

Oil (<20,000 cfg/bo overall) or Gas (≥20,000 cfg/bo overall): Gas

What is the minimum accumulation size? 0.5 mmboe grown  
(the smallest accumulation that has potential to be added to reserves)

No. of discovered accumulations exceeding minimum size:	Oil:	<u>0</u>	Gas:	<u>0</u>
Established (>13 accums.)	Frontier (1-13 accums.)		Hypothetical (no accums)	<u>X</u>

Median size (grown) of discovered oil accumulations (mmbo):

1st 3rd	<u>          </u>	2nd 3rd	<u>          </u>	3rd 3rd	<u>          </u>
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Median size (grown) of discovered gas accumulations (bcfg):

1st 3rd	<u>          </u>	2nd 3rd	<u>          </u>	3rd 3rd	<u>          </u>
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**Assessment-Unit Probabilities:**

<u>Attribute</u>	<u>Probability of occurrence (0-1.0)</u>
1. <b>CHARGE:</b> Adequate petroleum charge for an undiscovered accum. ≥ minimum size:	<u>1.0</u>
2. <b>ROCKS:</b> Adequate reservoirs, traps, and seals for an undiscovered accum. ≥ minimum size:	<u>1.0</u>
3. <b>TIMING OF GEOLOGIC EVENTS:</b> Favorable timing for an undiscovered accum. ≥ minimum size:	<u>1.0</u>

**Assessment-Unit GEOLOGIC Probability** (Product of 1, 2, and 3): 1.00

**UNDISCOVERED ACCUMULATIONS**

**No. of Undiscovered Accumulations:** How many undiscovered accums. exist that are ≥ min. size?:  
(uncertainty of fixed but unknown values)

Oil Accumulations:	minimum (>0)	<u>1</u>	mode	<u>2</u>	maximum	<u>10</u>
Gas Accumulations:	minimum (>0)	<u>1</u>	mode	<u>5</u>	maximum	<u>30</u>

**Sizes of Undiscovered Accumulations:** What are the sizes (**grown**) of the above accums?:  
(variations in the sizes of undiscovered accumulations)

Oil in Oil Accumulations (mmbo):	minimum	<u>0.5</u>	median	<u>1.3</u>	maximum	<u>130</u>
Gas in Gas Accumulations (bcfg):	minimum	<u>3</u>	median	<u>8</u>	maximum	<u>800</u>

**AVERAGE RATIOS FOR UNDISCOVERED ACCUMS., TO ASSESS COPRODUCTS**

(uncertainty of fixed but unknown values)

<u>Oil Accumulations:</u>	minimum	mode	maximum
Gas/oil ratio (cfg/bo)	<u>750</u>	<u>1500</u>	<u>2250</u>
NGL/gas ratio (bngl/mmcf)	<u>25</u>	<u>50</u>	<u>75</u>
<u>Gas Accumulations:</u>	minimum	mode	maximum
Liquids/gas ratio (bliq/mmcf)	<u>12</u>	<u>25</u>	<u>38</u>
Oil/gas ratio (bo/mmcf)	<u></u>	<u></u>	<u></u>

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**SELECTED ANCILLARY DATA FOR UNDISCOVERED ACCUMULATIONS**

(variations in the properties of undiscovered accumulations)

<u>Oil Accumulations:</u>	minimum		mode		maximum
API gravity (degrees)	<u>20</u>		<u>38</u>		<u>55</u>
Sulfur content of oil (%)	<u>0</u>		<u>0.3</u>		<u>1.5</u>
Depth (m) of water (if applicable)	<u>0</u>		<u>50</u>		<u>200</u>
	minimum	F75	mode	F25	maximum
Drilling Depth (m)	<u>305</u>		<u>1220</u>		<u>3100</u>
<u>Gas Accumulations:</u>	minimum		mode		maximum
Inert gas content (%)	<u>0</u>		<u>2</u>		<u>10</u>
CO <sub>2</sub> content (%)	<u>0</u>		<u>1.5</u>		<u>10</u>
Hydrogen-sulfide content (%)	<u>0</u>		<u>0.5</u>		<u>3.5</u>
Depth (m) of water (if applicable)	<u>0</u>		<u>50</u>		<u>200</u>
	minimum	F75	mode	F25	maximum
Drilling Depth (m)	<u>305</u>		<u>2600</u>		<u>6100</u>

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**ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO STATES**  
**Surface Allocations** (uncertainty of a fixed value)

1.	<u>Oregon</u>	represents	<u>14.12</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>14.12</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>14.12</u>	<u>                    </u>
2.	<u>Washington</u>	represents	<u>85.88</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>85.88</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>85.88</u>	<u>                    </u>
3.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
4.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
5.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
6.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>

7.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
8.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
9.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
10.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
11.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
12.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____

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**ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO LAND ENTITIES**  
**Surface Allocations** (uncertainty of a fixed value)

1. <u>Federal Lands</u>	represents	<u>7.84</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>7.84</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>7.84</u>	<u>                    </u>
2. <u>Private Lands</u>	represents	<u>48.42</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>48.42</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>48.42</u>	<u>                    </u>
3. <u>Tribal Lands</u>	represents	<u>5.51</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>5.51</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>5.51</u>	<u>                    </u>
4. <u>Other Lands</u>	represents	<u>0.48</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.48</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.48</u>	<u>                    </u>
5. <u>OR State Lands</u>	represents	<u>0.76</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.76</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.76</u>	<u>                    </u>
6. <u>Offshore Oregon</u>	represents	<u>7.22</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>7.22</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>7.22</u>	<u>                    </u>

7.	<u>Offshore Washington</u>	represents	<u>29.78</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>29.78</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>29.78</u>	<u>                    </u>
8.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
9.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
10.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
11.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
12.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>

**ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO FEDERAL LAND SUBDIVISIONS**

**Surface Allocations** (uncertainty of a fixed value)

1.	<u>Bureau of Land Management (BLM)</u>	represents	<u>0.01</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>0.01</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>0.01</u>	<u>                    </u>
2.	<u>BLM Wilderness Areas (BLMW)</u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
3.	<u>BLM Roadless Areas (BLMR)</u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
4.	<u>National Park Service (NPS)</u>	represents	<u>3.68</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>3.68</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>3.68</u>	<u>                    </u>
5.	<u>NPS Wilderness Areas (NPSW)</u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
6.	<u>NPS Protected Withdrawals (NPSP)</u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>



Assessment Unit (name, no.)  
Tertiary Marine Gas, 50040201

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7. <u>US Forest Service (FS)</u>	represents	<u>3.66</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>3.66</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>3.66</u>	<u>                    </u>
8. <u>USFS Wilderness Areas (FSW)</u>	represents	<u>                    </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
9. <u>USFS Roadless Areas (FSR)</u>	represents	<u>                    </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
10. <u>USFS Protected Withdrawals (FSP)</u>	represents	<u>                    </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
11. <u>US Fish and Wildlife Service (FWS)</u>	represents	<u>0.49</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.49</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.49</u>	<u>                    </u>
12. <u>USFWS Wilderness Areas (FWSW)</u>	represents	<u>                    </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>

13. <u>USFWS Protected Withdrawals (FWSP)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
14. <u>Wilderness Study Areas (WS)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
15. <u>Department of Energy (DOE)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
16. <u>Department of Defense (DOD)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
17. <u>Bureau of Reclamation (BOR)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
18. <u>Tennessee Valley Authority (TVA)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____

19. Other Federal	represents	area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

20. \_\_\_\_\_ represents \_\_\_\_\_ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

### ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO ECOSYSTEMS

1. Oregon and Washington Coast Ranges (OWCR) represents 62.88 area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity		62.88	

<u>Gas in Gas Accumulations:</u>	
Volume % in entity	62.88

2. Willamette Valley and Puget Trough (WVPT) represents 0.13 area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity		0.13	

<u>Gas in Gas Accumulations:</u>			
Volume % in entity		0.13	

3. \_\_\_\_\_ represents \_\_\_\_\_ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

4. \_\_\_\_\_ represents \_\_\_\_\_ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

5. represents area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

6. \_\_\_\_\_ represents \_\_\_\_\_ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

7.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
8.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
9.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
10.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
11.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
12.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____